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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

RAHLL, JERRY T

ART UNIT

PAPER NUMBER

2874

DATE MAILED: 09/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/783,526

Applicant(s)

LIU, ANSHENG

Examiner

Jerry T. Rahl

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☐ Claim(s) 1-3, 5-8, 11, 12, 15, 16, 18-21, 23 and 24 is/are rejected.
- 7) ☐ Claim(s) 2, 4, 9, 10, 13, 14, 17, 22 and 25 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 February 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
- Paper No(s)/Mail Date 2/20/04, 7/26/04.

- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statements (IDS) submitted on 20 February 2004, 26 July 2004 and 28 July 2005 are in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Drawings

2. The drawings are objected to because the figure labels are not clear and uniform. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

3. Claim 2 is objected to because it repeats the phrase, "of the untapered outer core" twice.

This seems to be a typographical error. Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-2, 5-7, 11-12 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 6,160,927 to Leclerc et al.

6. Leclerc et al. describes a first optical waveguide (ZPE) disposed in a first semiconductor material including a inverted tapered inner core (14), having a larger end (top in Fig 7A) and a smaller end (bottom in Fig 7A), disposed in an untapered outer core (13) and a second optical waveguide (ZPD) disposed in a second semiconductor material that is a tapered optical waveguide (3), having a larger end (bottom in Fig 7A) and a smaller end (top in Figure 7A). Leclerc describes the larger end of the second waveguide disposed proximate the larger end of the inverted tapered inner core of the first waveguide such that a beam is directed from the smaller end to the larger end of the first waveguide to the larger end to the smaller end of the second waveguide (see Figs 7A and 7B and Columns 6-7).

7. Further, Leclerc describes the index of refraction of the untapered outer core as less than the refractive index of the tapered inner core.

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8. Further, Leclerc describes a third optical waveguide (untapered portion at the top of ZPD in Fig 7A) in the second semiconductor material that is coupled to the smaller end of the second optical waveguide.

9. Since Leclerc describes the second and third waveguides as made of the same materials, it is inherent that they have substantially equal refractive indices.

10. Further, Leclerc describes the second and third waveguides as rib waveguides (see Fig 7B).

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 3, 8, 16, 21 and 24 rejected under 35 U.S.C. 103(a) as being unpatentable over Leclerc.

13. Leclerc does not specifically describe an antireflection region between the larger ends of the waveguides. However, it is well-known in the art to use anti-reflective regions at interfaces between waveguides to reduce optical losses. Therefore, it would have been obvious to one of ordinary skill in the art to use such an antireflective region in the device of Leclerc.

14. Further, Leclerc does not specifically describe the first semiconductor material including SiON and the second semiconductor material including Si. However, these are semiconductor materials well-known in the art for use in waveguides and optical circuits for their beneficial

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properties as passive and active waveguides. Therefore, it would have been obvious to one of ordinary skill in the art to use such materials in the device described by Leclerc.

15. Claims 18-20 and 23-24 rejected under 35 U.S.C. 103(a) as being unpatentable over Leclerc as applied to the claims above, and further in view of U.S. Application No. 2002/0038900 to Yamauchi.

16. Leclerc describes an optical device as discussed above. Leclerc does not describe a system with the device disposed between a transmitter and a receiver, where a photonic device is disposed in the second semiconductor material.

17. Yamauchi describes an optical system with a transmitter (101A), an optical device (12) and a receiver (15), where the device is between the transmitter and receiver and the photonic device directs the optical beam to the receiver (see Figure 1). Further, Yamauchi describes the device (24, 27A, 27B) disposed in the same semiconductor material as an optical waveguide (see Figure 7).

18. Leclerc and Yamauchi are analogous art form the same field of endeavor of optical beam processing.

19. At the time of invention, it would have been obvious to one of ordinary skill in the art to use the device of Leclerc in the system of Yamauchi. The motivation for doing so would be to reduce losses (see Column 3 of Leclerc) to the active waveguide section (26) of Yamauchi.

20. Therefore, it would have been obvious to one of ordinary skill in the art to combine Leclerc with Yamauchi to obtain the present invention.

21. Yamauchi further describes an optical fiber (101) coupled between the transmitter and the waveguides.

Allowable Subject Matter

22. Claims 4, 9, 10, 13-14, 17 and 22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
23. Claims 4, 17 and 22 describe an antireflective region having a refractive index between that of the waveguides
24. Claims 9 and 25 describe the antireflective region including Si_3N_4 .
25. Claim 10 describes the tip width of the small end of the first waveguide as less than the tip width of the second waveguide.
26. Claims 13-14 describe shrinking the mode size of the beam by directing the beam into the untapered outer core of the first waveguide and then into the tapered inner core.
27. This is subject matter not described or reasonably suggested by the prior art of record.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jerry T. RahlI whose telephone number is (571) 272-2356. The examiner can normally be reached on M-Th (8:30-5:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on (571) 272-2344. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jerry T Rahl



MICHELLE CONNELLY-CUSHWA
PRIMARY EXAMINER